

## PATENT CLAIMS

1. A process for the preparation of water-absorbent, foam-type polymer structures,  
wherein an aqueous composition (A) containing
  - (A1) water,
  - (A2) one or more polymers based at least on
    - ( $\alpha$ 1) from 55 to 100 wt.% of a polymerized, monoethylenically unsaturated,  
acid-group-containing monomer or its salt, and on
    - ( $\alpha$ 2) from 0 to 45 wt.% of a polymerized, monoethylenically unsaturated  
monomer that is copolymerizable with ( $\alpha$ 1),wherein the sum of the amounts by weight of ( $\alpha$ 1) and ( $\alpha$ 2) is 100 wt.% and  
wherein at least 31.5 wt.% of the monomers, based on the total weight of the  
monomers ( $\alpha$ 1) and ( $\alpha$ 2), are acrylic acid or salts of acrylic acid,
  - (A3) one or more crosslinkers,
  - (A4) one or more blowing agents,
  - (A5) one or more surfactants,
  - (A6) and optionally further auxiliary substances,is foamed, and the foamed aqueous composition is then heated at a temperature in a  
range of from 50 to 300°C, so that the polymer (A2) crosslinks at least partially and  
the content of water (A1) is adjusted to not more than 15 wt.%, based on the total  
weight of the foam-type polymer structure that forms.
2. Process according to claim 1, wherein the polymer (A2) has a number-average  
molecular weight of at least 10,000 g/mol.
3. Process according to claim 1 or 2, wherein the foamed composition has a foam liter  
weight of from 10 to 1000 g/l.
4. Process according to one or more of claims 1 to 3, wherein the surface of the  
absorbent, foam-type polymer structure is smoothed in a further process step.
5. A water-absorbent, foam-type polymer structure obtainable by a process according  
to claim 1 to 4.

6. Water-absorbent, foam-type polymer structure according to claim 5, wherein the polymer structure has at least one of the following properties:
- (β1) an AUL (absorbency under load) of 0.9% NaCl solution under a load of 0.3 psi of at least 10 g/g;
  - (β2) a rate of absorption of more than 1 g/g/sec;
  - (β3) a maximum absorption capacity in a range of from 20 to 300 g/g;
  - (β4) a CRC (centrifugation retention capacity) in a range of from 7.5 to 100 g/g;
  - (β5) a mean pore size in a range of from 0.01 to 2 mm;
  - (β6) a mean pore density in a range of from 60 to 1200 g/m<sup>2</sup>.
7. A water-absorbent, foam-type polymer structure containing
- (B1) from 20 to 99.99 wt.%, based on the total weight of the polymer structure, of one or more crosslinked polymers based at least on
    - (γ1) from 50 to 99.9 wt.% of a polymerized, monoethylenically unsaturated, acid-group-containing monomer or its salt,
    - (γ2) from 0 to 45 wt.% of a polymerized, monoethylenically unsaturated monomer that is copolymerizable with (γ1), and
    - (γ3) from 0.001 to 5 wt.% of one or more crosslinkers,wherein the sum of the amounts by weight of (γ1) to (γ3) is 100 wt.% and at least 31.5 wt.% of the monomers, based on the total weight of the monomers (γ1) and (γ2), are acrylic acid or a salt thereof,
  - (B2) from 0.01 to 30 wt.% of one or more additives, based on the total weight of the polymer structure, and
  - (B3) from 0 to 15 wt.% of water, based on the total weight of the polymer structure,
- wherein the sum of the amounts by weight of (B1) to (B3) is 100 wt.% and wherein the water-absorbent, foam-type polymer structure has at least one of the properties (β1) to (β6) defined in claim 6.
8. Composite comprising a water-absorbent, foam-type polymer structure according to claim 5 to 7 and a substrate.

9. Process for the production of a composite according to claim 8, wherein a foamed composition as defined in claim 1 to 3 is brought into contact with at least a portion of the surface of a substrate and the substrate brought into contact with the foamed composition is then heated at a temperature in a range of from 50 to 300°C so that the polymer (A2) crosslinks at least partially, the content of water (A1) is adjusted to not more than 15 wt.%, based on the total weight of the foam-type polymer structure that forms, and the resulting foam-type polymer structure is immobilized on at least a portion of the surface of the substrate.
10. Process according to claim 9, wherein the substrate is a film of polymers, such as, for example, of polyethylene, polypropylene or polyamide, a metal, a nonwoven, a fluff, a tissue, a woven fabric, a natural or synthetic fibre, or another foam.
11. Process according to claim 9 or 10, wherein templates are used during application of the foamed, aqueous composition to the substrate.
12. A process for the production of a composite according to claim 8, wherein at least a portion of the surface of a water-absorbent, foam-type polymer structure according to any one of claims 5 to 7 is brought into contact with at least a portion of the surface of a substrate, and the polymer structure is then immobilized on at least a portion of the surface of the substrate.
13. Process according to claim 12, wherein the substrate is a thermoplastic sheet-form structure.
14. Composite obtainable by a process according to one or more of claims 9 to 13.
15. Use of a water-absorbent, foam-type polymer structure according to one or more of claims 5 to 7 or of a composite according to claim 8 or 14 in chemical products.
16. Chemical products containing a foam-type polymer structure according to one or more of claims 5 to 7 that absorbs water and aqueous liquids, or a composite according to claim 9 or 14.